

Claims

WE CLAIM:

1. A method for transferring liquids from a plurality of wells having openings arranged in a selected format to at least one receptacle, comprising displacing liquid in each well so that a convex meniscus swells from the opening, and contacting an orifice of a receptacle with the swollen meniscus to draw at least a portion of the liquid into the receptacle.
2. The method of claim 1, for transferring the liquids to a plurality of receptacles arranged in a format corresponding to the format of the well openings, comprising steps of displacing the liquid contained in each well so that a convex meniscus swells from the opening, and contacting the corresponding orifices of the receptacles with the swollen menisci to draw a portion at least of the liquids into the receptacles.
3. The method of claim 1 wherein the liquid displacing step comprises inwardly deforming a wall of each well to displace the liquid.
4. The method of claim 3 wherein the inwardly deforming step comprises applying mechanical pressure at an outer surface of the wall.
5. The method of claim 3 wherein the inwardly deforming step comprises applying fluid pressure at an outer surface the wall.
6. The method of claim 1 wherein the step of displacing the liquid comprises introducing a displacing fluid into a part of each well away from the opening.
7. The method of claim 6 wherein the displacing fluid is introduced through a vent through a part of the wall away from the opening.
8. The method of claim 6 wherein the displacing fluid is passed through a

membrane covering the opening, the membrane being permeable to the displacing fluid.

9. The method of claim 6 wherein the displacing fluid comprises a gas.
10. The method of claim 1 wherein:
the openings of the wells are in a plate;
the orifices are in a plate; and
the two plates are parallel during the contacting.
11. The method of claim 1 wherein the receptacle is part of a print head such that the liquid is propelled through the orifice during printing.
12. The method of claim 11 wherein the print head carries a plurality of receptacles having respective orifices through which liquid is propelled during printing.
13. The method of claim 11 wherein a plurality of swollen menisci are aligned and contacted with a plurality of orifices at the same time so that liquids may be transferred from a plurality of wells to the plurality of orifices at the same time.
14. The apparatus of claim 12 wherein the print head comprises means associated with each orifice for propelling liquid through the associated orifice.
15. The apparatus of claim 13 wherein the propelling means comprises a source of heat.
16. The apparatus of claim 13 wherein the propelling means comprises a piezoelectric device.
17. A method according to claim 1 additionally comprising propelling the liquid through the orifice.

18. A method according to claim 16 wherein liquid is propelled through the orifices so as to fabricate an array of binding agents.

19. A method according to claim 18 wherein the binding agents comprise nucleic acids.

20. A method according to claim 18 wherein the binding agents comprise peptides.

21. Apparatus for transferring a plurality of liquids, comprising a depot member having a plurality of wells each having a first end and an opening at a second end; a receiving member supporting at least one receptacle having an orifice; means for displacing liquid contained within the wells from the first end toward and through the openings at the second end; and means for moving the well openings and the at least one receptacle into proximity such that liquid displaced through the well openings contacts the receptacle at the orifice.

22. Apparatus of claim 21 wherein said receiving member supports a plurality of receptacles, and the moving means moves a plurality of the well openings and a plurality of the receptacles into proximity.

23. The apparatus of claim 22 wherein the receiving member is planar, and wherein the well openings are supported in a planar format.

24. The apparatus of claim 21 wherein each well includes a deformable wall portion at the first end, and the liquid-displacing means comprise means for inwardly deforming the deformable wall portions.

25. The apparatus of claim 24 wherein the wall-deforming means comprises mechanical means for pressing at an outer surface of the deformable wall portion.

26. The apparatus of claim 24 wherein the wall-deforming means comprises means for applying fluid pressure at the outer surface of the deformable wall portion.

27. The apparatus of claim 21 wherein each well comprises a vent positioned away from the opening, and the liquid-displacing means comprise means for introducing a displacing fluid through the vents and into the wells.

28. Apparatus for transferring a plurality of liquids, comprising a depot member having a plurality of wells each having a first end and an opening at a second end; a receiving member supporting at least one receptacle having an orifice; means for displacing liquid contained within the wells from the first end toward and through the openings at the second end; and means for moving the well openings and the at least one receptacle into proximity such that liquid displaced through the well openings contacts the receptacle at the orifice;

wherein each well comprises a vent positioned away from the opening, and the liquid-displacing means comprise means for introducing a displacing fluid through the vents and into the wells;

wherein the vent is covered by a membrane that is permeable to the displacing fluid.

29. A depot member comprising a plate with a plurality of wells each having a first end and an opening at a second end, wherein each well includes a deformable wall portion at the first end, such that when the deformable wall portion of each well is inwardly deformed while water is in the well the water will be displaced from the well to form a convex meniscus swelling from the opening.

30. A depot member comprising a plate with a plurality of wells each having an opening and a vent positioned away from the opening wherein the vent is covered by a membrane that is permeable to a displacing fluid, such that when displacing fluid is introduced through the membrane and vent while water is in the well the water will be displaced from the well to form a convex meniscus swelling from the opening.